# TABLE OF CONTENTS



## TABLES

# 4.11 NOISE

## 4.11.1 INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and mitigation measures for the Long Beach Sports Park in the City of Long Beach, California. This report is intended to satisfy the City of Long Beach's requirement for a project-specific noise impact analysis by examining the short-term and long-term impacts of the project and by evaluating the effectiveness of mitigation measures incorporated as part of the project design.

## 4.11.2 EXISTING ENVIRONMENTAL SETTING

### Fundamentals of Noise

**Noise Definition.** Noise impacts can be described in three categories. The first is audible impact that refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3.0 decibels (dB) or greater, since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1.0 and 3.0 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise levels of less than 1.0 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant. Therefore, a 3 dBA increase in long-term noise levels is used as a threshold of significant change in this noise analysis. The decreases in noise level due to distance divergence were also used to analyze the effects of construction noise associated with the proposed project.

**Characteristics of Sound.** Sound is increasing to such disagreeable levels in our environment that it can threaten our quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep. To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect our ability to hear. Pitch is the number of complete vibrations or cycles per second of a wave that result in the tone's range from high to low. Loudness is the strength of a sound that describes a noisy or quiet environment and is measured by the amplitude of the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

**Measurement of Sound.** Sound intensity is measured through the A-weighted scale (i.e., dBA) to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-

emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale, representing points on a sharply rising curve. For example, 10 decibels are 10 times more intense than 1 decibel, 20 decibels are 100 times more intense, and 30 decibels are 1,000 times more intense. Thirty decibels represent 1,000 times as much acoustic energy as one decibel. A sound as soft as human breathing is about ten times greater than zero decibel. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A ten decibel increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately six decibels for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source such as highway traffic or railroad operations, the sound decreases three decibels for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases four and one-half decibels for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. However, the predominant rating scales for human communities in the State of California are the Equivalent-Continuous sound level ($L_{eq}$) and Community Noise Equivalent (CNEL) based on A-weighted decibels (dBA). $L_{eq}$ is the total sound energy of time-varying noise over a sample period. CNEL is the time-varying noise over a 24-hour period, with a weighting factor of 5 dBA applied to the hourly $L_{eq}$ for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and with a weighting factor of 10 dBA from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). The noise adjustments are added to the noise events occurring during the more sensitive hours. Day-night average noise ($L_{dn}$) is similar to the CNEL but without the adjustment for nighttime noise events. CNEL and $L_{dn}$ are normally exchangeable and within 1 dB of each other. Other noise-rating scales of importance when assessing annoyance factor include the maximum noise level, or $L_{max}$, and percentile noise exceedance levels, or $L_N$. $L_{max}$ is the highest exponential-time-averaged sound level that occurs during a stated time period. It reflects peak operating conditions and addresses the annoying aspects of intermittent noise. $L_N$ is the noise level that is exceeded "N" percent of the time during a specified time period. For example, the $L_{10}$ noise level represents the noise level exceeded 10 percent of the time during a stated period. The $L_{50}$ noise level represents the median noise level. Half the time the noise level exceeds this level and half the time it is less than this level. The $L_{90}$ noise level represents the noise level exceeded 90 percent of the time and is considered the lowest noise level experienced during a monitoring period. It is normally referred to as the background noise level.

**Psychological and Physiological Effects of Noise.** Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects our entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure, functions of the heart, and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the

noise level reaches 120 dBA, a tickling sensation occurs in the human ear even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 190 dBA will rupture the eardrum and permanently damage the inner ear. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying less developed areas.

### Sensitive Land Uses in the Project Vicinity

Certain land uses are considered more sensitive to noise than others. Examples of these include residential areas, educational facilities, hospitals, childcare facilities, and senior housing. The closest off-site sensitive land use to the project site is the cemetery immediately to the south.

The Long Beach Municipal Airport is located approximately two miles northeast of the project site. Existing properties immediately adjacent to the project site include vacant land, a cemetery, oil extraction wells, and various industrial and commercial developments. Long Beach Memorial Medical Center (LBMMC) is approximately one-half mile west of the project site.

### Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on Atlantic Avenue and Willow Street is the dominant source contributing to area ambient noise levels. Noise from motor vehicles is generated by engine vibrations, the interaction between the tires and the road, and the exhaust system. Noise levels on and in the vicinity of the project site will change as a result of the proposed project. Potential noise impacts associated with the project include road noise due to increases in vehicular traffic and construction noise. Noise impacts may also occur during events held on the project site.

**Existing Traffic Noise.** Existing traffic noise levels in the study area are listed in Table 4.11.A. As shown in Table 4.11.A, existing traffic noise levels are generally moderate along Atlantic Avenue, California Avenue, Orange Avenue, Walnut Avenue, Spring Street, Willow Street, and other streets in the project vicinity. For all but Atlantic Avenue and Willow Street, the 70 dBA CNEL traffic noise contour would be confined within the roadway right-of-way.

## 4.11.3 METHODOLOGY

The Federal Highway Administration (FHWA) highway traffic noise prediction model (FHWA RD-77-108) was used to evaluate existing and proposed highway traffic-related noise conditions along Atlantic Avenue, California Avenue, Orange Avenue, Walnut Avenue, Spring Street, Willow Street, and other roadways in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The existing average daily traffic (ADT) volumes in the area were taken from the traffic report prepared for this project by Linscott, Law & Greenspan Engineers (LLG, March 2004). The resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values.

## Table 4.11.A: Existing Baseline Traffic Noise Levels

| Roadway Segment | ADT | Center-line to 70 CNEL (feet) | Center-line to 65 CNEL (feet) | Center-line to 60 CNEL (feet) | CNEL (dBA) 50 feet from Outermost Lane |
|---|---|---|---|---|---|
| Atlantic Ave. north of Spring St. | 27,650 | 72 | 148 | 316 | 69.8 |
| Atlantic Ave. between Spring St. and Willow St. | 23,895 | 66 | 135 | 287 | 69.2 |
| Atlantic Ave. south of Willow St. | 18,790 | 58 | 115 | 244 | 68.1 |
| California Ave. north of Spring St. | 5,620 | < 50[1] | < 50 | 90 | 62.5 |
| California Ave. between Spring St. and Willow St. | 5,475 | < 50 | < 50 | 89 | 62.4 |
| California Ave. south of Willow St. | 7,160 | < 50 | < 50 | 106 | 63.6 |
| Orange Ave. north of 32nd St. | 14,620 | < 50 | 96 | 206 | 68.0 |
| Orange Ave. between 32nd St. and I-405 SB Ramps | 16,210 | < 50 | 103 | 221 | 68.4 |
| Orange Ave. between I-405 SB Ramps and Spring St. | 16,305 | < 50 | 104 | 222 | 68.4 |
| Orange Ave. between Spring St. and 29th St. | 12,280 | < 50 | 86 | 184 | 67.2 |
| Orange Ave. between 29th St. and 28th St. | 11,050 | < 50 | 80 | 171 | 66.7 |
| Orange Ave. between 28th St. and Willow St. | 9,925 | < 50 | 75 | 160 | 66.3 |
| Orange Ave. south of Willow St. | 9,590 | < 50 | 73 | 156 | 66.1 |
| Walnut Ave. north of Spring St. | 6,240 | < 50 | 56 | 117 | 64.3 |
| Walnut Ave. between Spring St. and Willow St. | 7,165 | < 50 | 61 | 129 | 64.9 |
| Walnut Ave. south of Willow St. | 12,180 | < 50 | 86 | 183 | 67.2 |
| 32nd St. west of Orange Ave. | 1,170 | < 50 | < 50 | < 50 | 54.9 |
| 32nd St. east of Orange Ave. | 7,330 | < 50 | < 50 | 86 | 62.8 |
| I-405 SB Ramps west of Orange Ave. | 7,120 | < 50 | < 50 | 85 | 62.7 |
| Spring St. west of Atlantic Ave. | 12,720 | < 50 | 90 | 189 | 66.4 |
| Spring St. between Atlantic Ave. and California Ave. | 12,700 | < 50 | 90 | 189 | 66.4 |
| Spring St. between California Ave. and Orange Ave. | 16,095 | < 50 | 105 | 221 | 67.4 |
| Spring St. between Orange Ave. and Walnut Ave. | 16,250 | < 50 | 105 | 222 | 67.5 |
| Spring St. east of Walnut Ave. | 15,140 | < 50 | 101 | 212 | 67.2 |
| 29th St. east of Orange Ave. | 1,230 | < 50 | < 50 | < 50 | 55.1 |
| 28th St. east of Orange Ave. | 1,210 | < 50 | < 50 | < 50 | 55.0 |
| Willow St. west of Atlantic Ave. | 28,520 | 90 | 181 | 385 | 70.4 |
| Willow St. between Atlantic Ave. and California Ave. | 29,335 | 91 | 185 | 392 | 70.5 |
| Willow St. between California Ave. and Orange Ave. | 30,855 | 94 | 191 | 405 | 70.7 |
| Willow St. between Orange Ave. and Walnut Ave. | 30,200 | 93 | 188 | 400 | 70.6 |
| Willow St. east of Walnut Ave. | 35,710 | 102 | 210 | 446 | 71.3 |

Source: LSA Associates, Inc., March 2004.

[1] Traffic noise within 50 feet of roadway centerline requires site-specific analysis.

## 4.11.4 THRESHOLDS OF SIGNIFICANCE CRITERIA

A project will normally have a significant effect on the environment related to noise if it will

- substantially increase the ambient noise levels for adjoining areas, or
- conflict with adopted environmental plans and goals of the community in which it is located

The applicable noise standards governing the project site are the criteria in the City of Long Beach's Noise Element of the General Plan and Municipal Code.

### City of Long Beach Noise Standards

**Noise Element of the General Plan.** The Noise Element of the General Plan contains noise standards for mobile noise sources. These standards address the impacts of noise from adjacent roadways and airports. The City specifies outdoor and indoor noise limits for residential uses, places of worship, educational facilities, hospitals, hotels/motels, and commercial and other land uses. The noise standard for exterior living areas is 65 dBA CNEL. The indoor noise standard is 45 dBA CNEL, which is consistent with the standard in the California Noise Insulation Standard.

**Municipal Code.** The City of Long Beach has adopted a quantitative Noise Control Ordinance, No. C-5371 Long Beach 1978 (Municipal Code, Chapter 8.80). The ordinance establishes maximum permissible hourly noise levels ($L_{50}$) for different districts throughout the City. Tables 4.11.B and 4.11.C list exterior noise and interior noise limits for various land uses.

**Table 4.11.B: Exterior Noise Limits, $L_N$ (dBA)**

| Receiving Land Use | Time Period | $L_{50}$ | $L_{25}$ | $L_8$ | $L_2$ | $L_{max}$ |
|---|---|---|---|---|---|---|
| Residential (District One) | Night: 10:00 p.m. – 7:00 a.m. | 45 | 50 | 55 | 60 | 65 |
| | Day: 7:00 a.m. – 10:00 p.m. | 50 | 55 | 60 | 65 | 70 |
| Commercial (District Two) | Night: 10:00 p.m. – 7:00 a.m. | 55 | 60 | 65 | 70 | 75 |
| | Day: 7:00 a.m. – 10:00 p.m. | 60 | 65 | 70 | 75 | 80 |
| Industrial (District Three) | Anytime* | 65 | 70 | 75 | 80 | 85 |
| Industrial (District Four) | Anytime* | 70 | 75 | 80 | 85 | 90 |

* For use at boundaries rather than for noise control within industrial districts.

**Table 4.11.C: Maximum Interior Sound Levels, $L_N$ (dBA)**

| Receiving Land Use | Time Interval | $L_8$ | $L_2$ | $L_{max}$ |
|---|---|---|---|---|
| Residential | 10:00 p.m. – 7:00 a.m. | 35 | 40 | 45 |
| | 7:00 a.m. – 10:00 p.m. | 45 | 50 | 55 |
| School | 7:00 a.m. – 10:00 p.m. (while school is in session) | 45 | 50 | 55 |
| Hospital and other noise-sensitive zones | Anytime | 40 | 45 | 50 |

The City's Noise Control Ordinance also governs the time of day that construction work can be performed. The Noise Ordinance prohibits construction, drilling, repair, alteration, or demolition work between the hours of 10:00 p.m. and 7:00 a.m. on weekdays or at any time on weekends or federal holidays if the noise would create a disturbance across a residential or commercial property line or violate the quantitative provisions of the ordinance.

Chapter 12 of the City's Municipal Code, "Oil Production Regulations," includes standards for noise from oil operations. Chapter 12 includes restriction of activities between 9:30 p.m. and 7:30 a.m. in order to protect noise-sensitive receptors. Also, Section 12.32.010 of the Oil Production Regulations makes it unlawful to operate oil production wells in a manner that causes exterior and interior noise levels at the receiving property to be in excess of those limits provided in the City's Noise Ordinance, Chapter 8.8 of the Municipal Code.

## 4.11.5 IMPACTS AND MITIGATION MEASURES

Implementation of the proposed project would result in short-term construction and long-term traffic noise impacts. Once the project has been completed the noise generated by on-site activities may impact neighboring sensitive uses. The closest sensitive land uses to the project site are the cemeteries immediately to the south and the LBMMC approximately one-half mile to the west. The following focuses on the increase in noise associated with the construction and operation of the proposed project and the traffic in the project area.

### Less Than Significant Impacts

**Traffic Noise Impact.** Tables 4.11.D and 4.11.E list future noise levels along Atlantic Avenue, California Avenue, Orange Avenue, Walnut Avenue, Spring Street, Willow Street, and other roadways in the project vicinity under the year 2006 baseline and with project scenarios. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix D of this EIR.

Tables 4.11.D and 4.11.E show the traffic noise levels for 2006 with and without the project. Traffic noise levels would continue to be low to moderate. The increase in project-related traffic noise levels would be 1.1 dBA for Orange Avenue, and all others are less than 1.0 dBA. These noise level increases from traffic noise is less than 3 dBA and would not be considered significant. No mitigation measures are required.

Based on the traffic study prepared for this project (LLG, March 2004), implementation of the proposed project would generate 3,970 daily trips on weekdays and 7,240 daily trips on Saturdays. These daily traffic trips would be distributed on Spring Street and Orange Avenue. A doubling of existing traffic volume is needed to generate a 3 dBA increase in traffic noise. Because the traffic volume increases are between 0 and 22 percent, vehicular traffic trips associated with the project would add less than 3 dBA to existing noise levels and, therefore, would not result in significant traffic noise impacts on off-site sensitive uses.

## Table 4.11.D: Year 2006 Baseline Traffic Noise Levels

| Roadway Segment | ADT | Center-line to 70 CNEL (feet) | Center-line to 65 CNEL (feet) | Center-line to 60 CNEL (feet) | CNEL (dBA) 50 feet from Outermost Lane |
|---|---|---|---|---|---|
| Atlantic Ave. north of Spring St. | 32,910 | 80 | 166 | 354 | 70.6 |
| Atlantic Ave. between Spring St. and Willow St. | 28,645 | 73 | 152 | 323 | 70.0 |
| Atlantic Ave. south of Willow St. | 23,090 | 65 | 132 | 280 | 69.0 |
| California Ave. north of Spring St. | 7,220 | < 50[1] | < 50 | 107 | 63.6 |
| California Ave. between Spring St. and Willow St. | 6,610 | < 50 | < 50 | 101 | 63.2 |
| California Ave. south of Willow St. | 8,300 | < 50 | 55 | 117 | 64.2 |
| Orange Ave. north of 32nd St. | 16,700 | < 50 | 105 | 226 | 68.5 |
| Orange Ave. between 32nd St. and I-405 SB Ramps | 18,585 | 53 | 113 | 242 | 69.0 |
| Orange Ave. between I-405 SB Ramps and Spring St. | 18,760 | 54 | 114 | 244 | 69.0 |
| Orange Ave. between Spring St. and 29th St. | 14,035 | < 50 | 94 | 201 | 67.8 |
| Orange Ave. between 29th St. and 28th St. | 12,705 | < 50 | 88 | 188 | 67.3 |
| Orange Ave. between 28th St. and Willow St. | 11,485 | < 50 | 82 | 176 | 66.9 |
| Orange Ave. south of Willow St. | 11,060 | < 50 | 80 | 172 | 66.7 |
| Walnut Ave. north of Spring St. | 6,740 | < 50 | 58 | 124 | 64.6 |
| Walnut Ave. between Spring St. and Willow St. | 7,775 | < 50 | 64 | 136 | 65.2 |
| Walnut Ave. south of Willow St. | 9,950 | < 50 | 75 | 160 | 66.3 |
| 32nd St. west of Orange Ave. | 1,940 | < 50 | < 50 | < 50 | 57.1 |
| 32nd St. east of Orange Ave. | 8,590 | < 50 | < 50 | 96 | 63.5 |
| I-405 SB Ramps west of Orange Ave. | 7,890 | < 50 | < 50 | 91 | 63.2 |
| Spring St. west of Atlantic Ave. | 16,480 | < 50 | 106 | 224 | 67.6 |
| Spring St. between Atlantic Ave. and California Ave. | 17,260 | < 50 | 109 | 231 | 67.8 |
| Spring St. between California Ave. and Orange Ave. | 21,665 | 62 | 126 | 269 | 68.7 |
| Spring St. between Orange Ave. and Walnut Ave. | 20,675 | 61 | 123 | 260 | 68.5 |
| Spring St. east of Walnut Ave. | 19,480 | 59 | 118 | 250 | 68.3 |
| 29th St. east of Orange Ave. | 1,340 | < 50 | < 50 | < 50 | 55.5 |
| 28th St. east of Orange Ave. | 1,300 | < 50 | < 50 | < 50 | 55.3 |
| Willow St. west of Atlantic Ave. | 32,990 | 98 | 199 | 424 | 71.0 |
| Willow St. between Atlantic Ave. and California Ave. | 33,140 | 98 | 200 | 425 | 71.0 |
| Willow St. between California Ave. and Orange Ave. | 34,755 | 101 | 206 | 438 | 71.2 |
| Willow St. between Orange Ave. and Walnut Ave. | 34,275 | 100 | 204 | 434 | 71.2 |
| Willow St. east of Walnut Ave. | 36,980 | 105 | 214 | 457 | 71.5 |

Source: LSA Associates, Inc., March 2004.

[1] Traffic noise within 50 feet of roadway centerline requires site-specific analysis.

## Table 4.11.E: Year 2006 With Project Traffic Noise Levels

| Roadway Segment | ADT | Center-line to 70 CNEL (feet) | Center-line to 65 CNEL (feet) | Center-line to 60 CNEL (feet) | CNEL (dBA) 50 feet from Outermost Lane | Increase CNEL (dBA) 50 feet from Outermost Lane |
|---|---|---|---|---|---|---|
| Atlantic Ave. north of Spring St. | 33,650 | 81 | 168 | 360 | 70.7 | 0.1 |
| Atlantic Ave. between Spring St. and Willow St. | 28,645 | 73 | 152 | 323 | 70.0 | 0.0 |
| Atlantic Ave. south of Willow St. | 23,150 | 65 | 132 | 281 | 69.0 | 0.0 |
| California Ave. north of Spring St. | 7,510 | < 50[1] | 52 | 109 | 63.8 | 0.2 |
| California Ave. between Spring St. and Willow St. | 6,785 | < 50 | < 50 | 102 | 63.3 | 0.1 |
| California Ave. south of Willow St. | 8,590 | < 50 | 57 | 120 | 64.4 | 0.1 |
| Orange Ave. north of 32nd St. | 17,050 | < 50 | 107 | 229 | 68.6 | 0.1 |
| Orange Ave. between 32nd St. and I-405 SB Ramps | 19,845 | 56 | 118 | 253 | 69.3 | 0.3 |
| Orange Ave. between I-405 SB Ramps and Spring St. | 20,820 | 57 | 122 | 261 | 69.5 | 0.5 |
| Orange Ave. between Spring St. and 29th St. | 18,155 | 53 | 111 | 238 | 68.9 | 1.1 |
| Orange Ave. between 29th St. and 28th St. | 16,250 | < 50 | 103 | 221 | 68.4 | 1.1 |
| Orange Ave. between 28th St. and Willow St. | 13,305 | < 50 | 91 | 194 | 67.5 | 0.6 |
| Orange Ave. south of Willow St. | 11,410 | < 50 | 82 | 175 | 66.9 | 0.1 |
| Walnut Ave. north of Spring St. | 6,740 | < 50 | 58 | 124 | 64.6 | 0.0 |
| Walnut Ave. between Spring St. and Willow St. | 7,775 | < 50 | 64 | 136 | 65.2 | 0.0 |
| Walnut Ave. south of Willow St. | 9,950 | < 50 | 75 | 160 | 66.3 | 0.0 |
| 32nd St. west of Orange Ave. | 1,940 | < 50 | < 50 | < 50 | 57.1 | 0.0 |
| 32nd St. east of Orange Ave. | 9,500 | < 50 | < 50 | 103 | 64.0 | 0.4 |
| I-405 SB Ramps west of Orange Ave. | 8,690 | < 50 | < 50 | 97 | 63.6 | 0.4 |
| Spring St. west of Atlantic Ave. | 17,050 | < 50 | 109 | 229 | 67.7 | 0.1 |
| Spring St. between Atlantic Ave. and California Ave. | 18,570 | 57 | 115 | 243 | 68.1 | 0.3 |
| Spring St. between California Ave. and Orange Ave. | 23,375 | 65 | 133 | 282 | 69.1 | 0.3 |
| Spring St. between Orange Ave. and Walnut Ave. | 21,825 | 63 | 127 | 270 | 68.8 | 0.2 |
| Spring St. east of Walnut Ave. | 20,630 | 61 | 123 | 260 | 68.5 | 0.2 |
| 29th St. east of Orange Ave. | 1,340 | < 50 | < 50 | < 50 | 55.5 | 0.0 |
| 28th St. east of Orange Ave. | 1,300 | < 50 | < 50 | < 50 | 55.3 | 0.0 |
| Willow St. west of Atlantic Ave. | 33,470 | 99 | 201 | 428 | 71.1 | 0.1 |
| Willow St. between Atlantic Ave. and California Ave. | 33,675 | 99 | 202 | 429 | 71.1 | 0.1 |
| Willow St. between California Ave. and Orange Ave. | 35,555 | 102 | 209 | 445 | 71.3 | 0.1 |
| Willow St. between Orange Ave. and Walnut Ave. | 35,160 | 101 | 208 | 442 | 71.3 | 0.1 |
| Willow St. east of Walnut Ave. | 37,860 | 106 | 218 | 464 | 71.6 | 0.1 |

Source: LSA Associates, Inc., March 2004.

[1] Traffic noise within 50 feet of roadway centerline requires site-specific analysis.

None of the outdoor activities planned in the Sports Park would be located any closer than 200 feet from the nearest roadway centerline. Along Spring Street, California Avenue, and Orange Avenue, the 65 dBA CNEL contour is located 133 feet or less from the roadway centerline. Therefore, no outdoor activities in the Sports Park will be exposed to significant noise levels above 65 dBA CNEL, and no mitigation measures are required for exterior noise on the project site.

**Airport Noise Impact.** The Long Beach Municipal Airport is located approximately two miles northeast of the project site. Based on the aircraft noise contours produced by the airports, the project site does not lie within the 60 dBA CNEL contour of the airport. Therefore, the potential for a significant impact from airport-related activities is small, and a single-event noise impact analysis is not warranted for this site.

**On-Site Sources Noise Impact.** Development of the proposed project would include an office or retail structure on a 2.5-acre commercial parcel, a youth golf center including a two-story, 15,000-square-foot building, and an administrative building and three restaurant/concession buildings in the Sports Park. The cemeteries to the south of the Sports Park are the only off-site uses that are sensitive to on-site noise. LBMMC is located beyond the effects of on-site noise. The primary noise-generating activity on site that would have an effect on the cemetery is team sports activities in the soccer fields adjacent to the southern boundary. The distance from the edge of the closest soccer field to the property line of the cemetery is approximately 100 feet. In addition to the distance, the soccer fields will be approximately 15 feet below the level of the cemetery.

Based on the average A-weighted sound level of speech for different vocal efforts under quiet conditions at a distance of one meter (three feet) in a free field, quoted by Harry Levitt and John C. Webster in *Handbook of Acoustical Measurements and Noise Control* (Third Edition, edited by Cyril M Harris, 1991), male shouting would result in 88 dBA while female shouting is 82 dBA at a distance of three feet. These are all maximum sound pressure levels ($L_{max}$) measured at one meter, or three feet, from the person. In acoustics, every doubling of an equal sound energy would result in a 3 dBA increase in combined noise level. Therefore two males shouting at the same time (the worst-case scenario is to have them reaching the peak level at the same time) would result in 91 dBA at one meter (three feet), and two females shouting would result in 85 dBA. The distance from the soccer field to the southern property line is approximately 100 feet. Assuming up to 16 men and 16 women are yelling at one time, the play field noise would be approximately 71 dBA $L_{max}$ at 100 feet. The play fields on-site will be approximately 15 feet lower than the cemetery to the south. This change in elevation would reduce the play field noise by 8 to 10 dBA.

Therefore, noise from the play fields will not exceed the City's 65 dBA $L_{max}$ nighttime exterior noise limit for sensitive uses. Therefore, no mitigation measures are required for potential noise impacts to the cemeteries.

### Oil Pump Noise

Seventeen oil pumps will remain in operation on the project site once construction of the proposed project has been completed. Aboveground oil pumps generate noise levels of up to 60 dBA $L_{50}$ at a distance of 50 feet (based on ambient noise monitoring conducted on other project sites within the

City of Long Beach). Because three of the on-site oil pumps are electric submersible pumps, they will generate noise levels 10 to 15 dBA lower that the above ground oil pumps. For this analysis, the submersed oil pumps are projected to generate noise levels of up to 50 dBA $L_{50}$ at a distance of 50 feet.

The project site is currently designated District 4 in the City's Noise Ordinance and is therefore subject to an exterior noise threshold of 70 dBA $L_{50}$. The on-site use with the greatest exposure to pump noise is the outdoor eating area for the concession building adjacent to the soccer fields in the southwest corner of the project site. This outdoor area is within 30 feet of a submersed oil pump and 180 feet of four aboveground pumps. The combined noise level of all five oil pumps, within the outdoor eating area, is projected to be 58 dBA $L_{50}$. While this noise level will be perceptible, the pump noise will be below the City's 70 dBA $L_{50}$ standard. No on-site or off-site land uses will be exposed to pump noise exceeding 70 dBA $L_{50}$; therefore, no mitigation measures are required.

## Significant Impacts

**Construction Noise.** Short-term noise impacts would be associated with excavation, grading, and the erection of buildings on site during construction of the proposed project. Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area today but would no longer occur once construction of the project is completed.

Two types of short-term noise impacts could occur during the construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. A relatively high single-event noise exposure potential will exist at a maximum level of 87 dBA $L_{max}$ with trucks passing at 50 feet. However, the projected construction traffic will be minimal when compared to the existing traffic volumes on California Avenue, Orange Avenue, and other affected streets, and its associated long-term noise level change will not be perceptible. Therefore, short-term construction-related worker commutes and equipment transport noise impacts would not be substantial.

The second type of short-term noise impact is related to noise generated during excavation, grading, and construction on the project site. Construction is performed in discrete steps, each of which has its own mix of equipment and consequently its own noise characteristics. These various sequential phases would change the character of the noise generated on site. Therefore, the noise levels vary as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table 4.11.F lists maximum noise levels recommended for noise impact assessments for typical construction equipment based on a distance of 50 feet between the equipment and a noise receptor. Typical maximum noise levels range up to 91 dBA at 50 feet during the noisiest construction phases. The site preparation phase, which includes excavation and grading of the site, tends to generate the highest noise levels, because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three or four minutes at lower power settings.

**Table 4.11.F: Typical Maximum Construction Equipment Noise Levels ($L_{max}$)**

| Type of Equipment | Range of Maximum Sound Levels Measured (dBA at 50 feet) | Suggested Maximum Sound Levels for Analysis (dBA at 50 feet) |
|---|---|---|
| Pile Drivers, 12,000 to 18,000 ft-lb/blow | 81–96 | 93 |
| Rock Drills | 83–99 | 96 |
| Jack hammers | 75–85 | 82 |
| Pneumatic Tools | 78–88 | 85 |
| Pumps | 74–84 | 80 |
| Dozers | 77–90 | 85 |
| Scrapers | 83–91 | 87 |
| Haul Trucks | 83–94 | 88 |
| Cranes | 79–86 | 82 |
| Portable Generators | 71–87 | 80 |
| Rollers | 75–82 | 80 |
| Tractors | 77–82 | 80 |
| Front-End Loaders | 77–90 | 86 |
| Hydraulic Backhoe | 81–90 | 86 |
| Hydraulic Excavators | 81–90 | 86 |
| Graders | 79–89 | 86 |
| Air Compressors | 76–89 | 86 |
| Trucks | 81–87 | 86 |

Source: Noise Control for Buildings and Manufacturing Plants, Bolt, Beranek & Newman 1987.

Construction of the proposed project is expected to require the use of earthmovers, bulldozers, water trucks, and pickup trucks. This equipment would be used on the project site. Based on Table 4.11.F, the maximum noise level generated by each earthmover on the proposed project site is assumed to be 88 dBA $L_{max}$ at 50 feet from the earthmover. Each bulldozer would also generate 88 dBA $L_{max}$ at 50 feet. The maximum noise level generated by water and pickup trucks is approximately 86 dBA $L_{max}$ at 50 feet from these vehicles. Each doubling of a sound source with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level at each individual residence during this phase of construction would be 91 dBA $L_{max}$ at a distance of 50 feet from the active construction area. There are no residences in the vicinity of the project area, but the cemeteries to the south are potentially impacted by noise increases. Noise generated by construction activities between 7:00 a.m. and 10:00 p.m. (except weekends or federal holidays) are exempted from the Noise Control Ordinance standards. Therefore, if construction is limited to the hours specified, noise generated during construction will not result in a significant impact.

### Mitigation Measures

Noise impacts generated by traffic associated with the proposed project do not exceed the level of significance, and no traffic noise mitigation measures are proposed. The following measures are proposed to reduce the effect of short-term construction impacts:

**4.11.1** Construction will be limited to the hours of 7:00 a.m. to 10:00 p.m. Monday through Friday in accordance with the City of Long Beach's standards. No construction activities are permitted outside of these hours or on weekends and federal holidays.

**4.11.2** The following measures are included to further reduce potential construction noise impacts on nearby sensitive receptors:

a. During all site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards. The project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the project site.

b. The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receptors nearest the project site during all project construction.

### Level of Significance After Mitigation

There would be no significant noise impacts from short-term construction or long-term operation of the project site after implementation of the mitigation measures above.

## 4.11.6 CUMULATIVE IMPACTS

Construction and on-site operations are point sources of noise and would not contribute to off-site cumulative noise impacts from other planned and future projects. Project-related traffic would contribute to cumulative traffic noise impacts in the vicinity of the project site, but sound levels will not increase by more than 3 dBA from their corresponding existing levels. This would be considered a less than insignificant impact.